

## 植物组织中低聚糖乙酰化及毛细管气相色谱分析

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## Capillary Gas Chromatographic Analysis of Oligosaccharide Derivatives in Plant Tissue

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摘要

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**摘要** 建立一种用乙酰化衍生处理低聚糖并用毛细管气相色谱-FID进行分析的方法。以1-甲基咪唑为催化剂并以乙酸酐为乙酰化试剂,同时对植物样品中蔗糖、棉子糖和水苏糖等低聚糖乙酰化产物进行毛细管气相色谱分离和FID检测。确定了低聚糖乙酰化衍生物的毛细管气相色谱分析条件,并对低聚糖乙酰化反应条件及色谱分离条件进行了优化。结果表明,在80-1 000 ng·μL<sup>-1</sup>范围内线性关系良好,蔗糖、棉子糖和水苏糖的相关系数(R)分别为0.995 2、0.995 7和0.987 7,并且精度与回收率均较高。使用该方法对低聚糖进行乙酰化反应重现性好、所需样品材料及试剂量少且污染毒害小,能够得到理想的分离、检测和定量分析效果,适用于少量植物组织中低聚糖的定量分析。该方法在食品、医药检测和基础科学研究领域均具有广泛的适用性及参考价值。

**关键词:** 乙酰化 FID检测 气相色谱 低聚糖

**Abstract:** We introduce the establishment and optimization of capillary gas chromatography-flame ionization detection (FID) for analysis of acetylated oligosaccharides. Chemical and instrumental analysis of oligosaccharides requires derivating them into their derivatives. We used 1-methylimidazole as a catalyst and acetic anhydride as a reagent for acetylation of oligosaccharides. The acetylation and separation of acetylated products of sucrose, raffinose and stachyose were optimized and effectively separated by gas chromatography on a DB-15 capillary column and detected by an FID detector. The method is accurate, precise and has high recovery rate. The recovery rates for sucrose, raffinose and stachyose were all above 90%. The standard curves of oligosaccharide acetylated derivatives showed a high linearity in the range of 80 to 1 000 ng·μL<sup>-1</sup> concentrations. The linear correlation coefficients were 0.995 2 for sucrose, 0.995 7 for raffinose and 0.987 7 for stachyose. The method is suitable for analysis of target compounds in the food sciences, medicine and biological sciences, with the advantages of high reproducibility, minor sampling and chemical consumption and environmental friendliness.

**Keywords:** acetylation FID detection gas chromatography oligosaccharides

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